



# **CIVIL AVIATION PUBLICATION**

## **CAP 31**

# **AIRCRAFT PARTS AUTHENTICITY**

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## AIRCRAFT PARTS AUTHENTICITY

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### 1. INTRODUCTION

#### 1.1 Background

The CAA is becoming increasingly concerned about the authenticity and serviceability of aircraft parts especially the quantity and variety of unapproved parts which are finding their way on to registered aircraft. Evidence indicates that these counterfeit and/or fraudulently identified parts are being imported, largely from North America; however, the CAA also has evidence of such bogus parts originating from other foreign sources.

Manufacturing and/or marketing bogus parts is not new but there has been recent evidence of the falsification of release documentation (BCAA Form One or equivalent).

Installing bogus parts onto aircraft has serious airworthiness implications; to illustrate just how serious, the following two examples are quoted involving aircraft which are available in the international market place:

- (a) A helicopter main rotor blade complete with release documentation was traced as having been scrapped by the manufacturer during the manufacturing process.
- (b) An engine mount described as fitted new to an aircraft in 1979 was traced as having been factory installed in 1966.

The need to ensure that parts installed on an aircraft meet the design specification and are serviceable is self-evident. The installation of any part failing to meet the intended design requirements degrades those requirements, leading to a degradation of airworthiness.

#### 1.2 Objective

It is essential that for the purposes of continuing airworthiness a system of control exists which ensures that only parts meeting the approved design data applicable to a particular aircraft are installed on that aircraft. This CAP provides guidance on the establishment of such a system.

#### 1.3 References

- (a) ANTR Part 21, Subpart K (Parts & Appliances) for approved parts
- (b) FAA Advisory Circular 21-29B for Suspected Unapproved Parts Programme

### 2. APPROVED PARTS

An approved part is one whose design has been found to be acceptable to the State of Design, whose proper manufacture has been approved by the State of Registry, and that has been found to be in a condition for safe operation by the State of Registry.

*Note: Parts approved are eligible for installation on a specific aircraft if, and only if, they also meet the approved design data applicable to the particular aircraft they are to be installed on. For example, a seat designed and approved for 9 g forward loads is not eligible for installation on an aircraft which is required to have a seat that is dynamically tested for 16 g.*



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Standard parts such as fasteners are considered as approved parts when they are in compliance with a national or industry accepted standard and when referenced in the type design of the particular aircraft.

### 3. UNAPPROVED PARTS

#### 3.1 Description

For the purpose of this CAP an unapproved part is a part or material intended for installation on a type certificated product/aircraft, which has been neither manufactured according to approved procedures, nor conforms to an approved type design; or it fails to conform to declared specifications or accepted industry standards (i.e. standard parts).

Unapproved parts include, but are not limited to:

- (a) Parts specified in the illustrated parts catalogues (IPC) of a type certificated aircraft, but which have been manufactured, reclaimed or reworked and then marked by an unauthorised source and provided with documents which indicate falsely that the part(s) are genuine and conform to the approved type design, or meet a particular industry standard and are offered for use as conforming with an aircraft manufacturer's authorised IPC.
- (b) Parts shipped directly to users by manufacturers, suppliers, or distributors who do not themselves hold appropriate production approvals for the parts, and have not been authorised to make direct shipments to users or stockists by the Type Certificate holder, who alone has production approval, e.g. production overruns. This is a particular phenomenon in the United States.
- (c) Parts which have not been maintained, overhauled or repaired in accordance with the requirements of approved airworthiness data and/or statutory requirements, or that have been maintained, overhauled or repaired by persons not authorised to perform and certify these functions.

Parts not meeting the criteria in paragraph 2 are considered to be unapproved. Any part not supported by the required documentation (see 3.2 below) would also be considered to be unapproved. Unapproved parts also include those parts improperly returned to service, for example:

- (a) parts supplied directly to the end user by a subcontractor without direct ship authority from the design approval holder and the State of Manufacture to do so;
- (b) parts maintained or approved for return to service by a person or organization not approved to do so;
- (c) parts not maintained in accordance with the requirements of the applicable approved data; and
- (d) parts having reaching their life limit, including, if applicable, any shelf-life limit.



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### 3.2 Supporting Documentation

A documentation process providing written evidence of the acceptability of a part is an essential element of any system designed to ensure that only approved parts are installed on an aircraft. Such a process is intended to provide all relevant information concerning the part to which it refers sufficient to enable a potential installer to readily ascertain its status.

Such documents will contain information relating to:

- (a) the authority under which it is issued;
- (b) reference identification for the purposes of traceability;
- (c) name, address and approval reference of the issuing organization;
- (d) work order, contract or invoice number;
- (e) quantity, description, part number and, if applicable, serial number of the part;
- (f) relevant information concerning any life limitations, including in-service history records;
- (g) the signature and approval reference of the person issuing the document; and
- (h) whether the part is new or used.

### 3.3 Precautions to Prevent the Inadvertent Acceptance of Unapproved Parts

Documentary evidence of compliance with an approved process will not in itself provide a guarantee against the installation of unapproved parts if the original supplier of such parts knowingly provides false information or otherwise sets out to deceive. It is always necessary to have secondary defences in place designed to give early warning of unapproved parts prior to their release for installation.

The primary defence in such cases is a strong, well-informed and alert parts ordering and receiving system which, through auditing and reports, establishes a satisfactory level of confidence in its parts suppliers and which:

- (a) ensures a continual correlation between parts ordered and parts received;
- (b) is alert to any unauthorized alterations to supporting documentation and to any inability of the supplier to supply the required documentation;
- (c) is aware if a quoted price for the part is significantly lower than that quoted by other suppliers;
- (d) is aware that delivery times are significantly shorter than those quoted by other suppliers; and
- (e) is aware of packaging methods used by approved parts manufacturers, maintenance organizations and distributors, and can detect deviations from these methods.



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Organizations, particularly approved maintenance organizations and operators, should ensure that all those staff who have routine contact with parts, including especially buyers, stores staff, mechanics and certifying staff, are fully aware of the dangers posed by unapproved parts and also the likely sources. Ample warnings should be given to such staff about accessing any unapproved parts database. Approved maintenance organizations and operators will also need to ensure that their parts suppliers are fully integrated into the reporting network, and audits will be necessary among staff at intervals to ensure that all remain vigilant to the problem.

### **4. NOTIFICATION & REPORTING**

#### **4.1 FAA Suspect Unapproved Parts Notifications**

The FAA and CAA have intensified efforts to educate the public regarding the potential safety threat posed by aeronautical parts that do not meet applicable design, manufacturing or maintenance requirements. To achieve this, the FAA established a Suspect Unapproved Parts programme (SUPs) and issued guidance in an Advisory Circular 21-29B.

Suspect Unapproved Parts Notifications can be found on FAA Internet site:

[www.faa.gov/about/office\\_org/headquarters\\_offices/avs/offices/sup/](http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/sup/)

Because of the increased activity being undertaken in the United States against suspect unapproved parts, it is likely that the vendors of these parts will direct their activities towards Europe and other parts of the world because of the reduced risk of detection.

#### **4.2 Unapproved Parts Reporting**

Systems used by end users to report to Type Certificate holders and regulatory agencies are intended to provide widespread warning of the detection of unapproved parts so that operators of similar equipment can be made aware as soon as possible. In view of the likely random appearance of unapproved parts, access to a reporting system should be easy and available at all reasonable times. It follows that publicity for the reporting system (and the programmes generally) should be widespread.

In order to obtain as much information as possible from a report of a suspected unapproved part, it is necessary to have a standardized reporting format. Information required will include part description and from where received; part and (if applicable) serial numbers; particular colours, markings, dimensions and features common to the unapproved part which distinguish it from the genuine item; and the nature of any accompanying documentation.

At any time a part is deemed to be suspect, it and any accompanying documentation should be quarantined immediately and held until the body responsible for processing the reports is satisfied that the evidence is no longer required or until the authenticity of the part has been established.

Some reports of suspected unapproved parts will eventually turn out to be false as further information becomes available in the form of supporting documentation, etc. A successful reporting system should accept such false alarms and the wasted effort they generate in the knowledge that to discourage them might eventually lead to the suppression of a genuine report.



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A relatively simple database, preferably computer driven, will be required to maintain a record and allow easy processing of reports of suspected unapproved parts. The database should be capable of interrogation such that any common thread within the reports received is readily identified by keyword access. The database itself can be a dedicated system or part of a much larger general occurrence reporting system.

In view of the international nature of the aviation industry and in particular the known international nature of the generation and distribution of unapproved parts, the ability to link national databases is obviously advantageous, the unimpeded cross-flow of information being essential in successfully combating the problem.

### 4.3 Mandatory Occurrence Reporting Procedures

Users of aircraft components and spares are reminded that suspected unapproved parts should be reported to the CAA through the Mandatory Occurrence Reporting (MOR) procedures. On receipt of an MOR, and where appropriate, the CAA will pass the details to the FAA SUPS office by the submission of a SUPS Report.

To assist in tracing unapproved parts or material, persons raising an MOR should, as far as possible, provide the following information on their report:

- (a) The name of the suspected unapproved part.
- (b) Part number, or any other number on the part.
- (c) Serial number of part.
- (d) List next higher assembly that suspected unapproved part is assembled into (i.e. fuel pump, engine, landing gear) and list part number, if known.
- (e) Quantity of suspected unapproved parts found or identified.
- (f) Make and model number of the aircraft or component that the suspected unapproved part is applicable to.
- (g) The identification of the commercial source of the suspected unapproved part. If the part is identified with Part Manufacturer or Distributor marking, this should be quoted.
- (h) Describe any pertinent facts relating to the suspected unapproved part and identify where part may be inspected (provide photos, invoices, etc., if available).
- (i) The date suspected unapproved part was discovered.
- (j) Name and address in full or the location where suspected unapproved part(s) was discovered.

In accordance with normal protocol for confidentiality any SUPS report submitted to the FAA would not give details of the MOR reporter.



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### 5. PROCUREMENT OF PARTS

#### 5.1 Parts stockists and distributors

It is recognized that parts stockists and distributors have a significant influence over preventing the use of unapproved parts. Such organizations have an established commercial role of stocking or obtaining parts, often at short notice. The BCAA does not approve stockists and distributors.

In airworthiness terms, the parts supplier's role is simply that of a holder of a part and its supporting data for a limited period, the part and data being passed in their entirety to the purchaser. The most effective control is exercised by the purchaser of the parts by ensuring that the part is correct and that the documentation truly reflects the status of the part. Further assurance is provided by the installer purchasing only from those suppliers having a known satisfactory record.

Parts distributors may also break down large orders of identical parts into smaller lots for shipment to end users. In this case they should provide documentation that the parts came from the original large order and either issue a second set of airworthiness documentation or attach a copy of the original airworthiness documentation.

#### 5.2 Parts removed from an aircraft no longer in service

Aircraft withdrawn from service are often used as a source of spare parts, a process sometimes described as "parting out". These parts, although serviceable at the time the aircraft was placed in storage, may have been affected adversely by storage conditions, including especially environmental factors, or by the length of storage.

The records for the aircraft and its parts prior to the aircraft being placed into storage will need to be researched in order to ascertain the previous maintenance history, and airworthiness directive, modification and repair status of the parts being removed. Any unusual events immediately prior to storage, e.g. heavy landings or lightning strikes, will also have to be considered when deciding on the serviceability of the parts being removed.

It is important that the part removal process be planned and controlled in a manner as close as possible to that adopted for routine maintenance tasks on in-service aircraft. The following points in particular should be considered:

- (a) the means by which the part is removed should be in accordance with the normal maintenance data (e.g. maintenance manuals), using the tooling specified;
- (b) adequate access equipment should be provided;
- (c) if conducted in the open, disassembly should cease during inclement weather;
- (d) all work should be carried out by appropriately qualified maintenance personnel;
- (e) all open connections should be blanked; and
- (f) a protected and enclosed quarantine storage area for the parts being removed should be provided in the immediate vicinity of the work area and



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- (g) normal maintenance documentary controls should be used, e.g. the use of work sheets or cards to record component removals, and label identification to show serviceability status.

An assessment for condition and eventual return to service of each removed part will need to be conducted by a suitably approved organization. The extent of the work necessary before the part is returned to service may, depending on various factors, range from a simple external visual inspection to a complete overhaul.

### 5.3 Parts Recovered From Aircraft Involved In Accidents

When an aircraft has been involved in an accident, the title to the salvage may pass from the insured owner to other persons (e.g. aircraft insurers); this salvage may be offered for sale either complete or as separate aircraft items in an “as is, where is” condition. While some items may be totally unaffected by the accident or incident which caused the aircraft to be declared as salvage, it is essential to obtain clear evidence that this is the case. If such evidence cannot be obtained, the item may not be returned to service.

Before overhaul and reinstallation can be considered, all such items must therefore be subject to airworthiness assessment and inspection in the light of adequate knowledge of the circumstances of the accident, subsequent storage and transport conditions, and with evidence of previous operational history obtained from valid airworthiness records. Confirmation of this assessment in the form of an airworthiness release is essential.

In particular, if a crash load is sufficient to take any part above its proof strength, residual strains may remain which could reduce the effective strength of the item or otherwise impair its functions. Loads higher than this may of course crack the item, with an even more dangerous potential. Further, a reduction in strength may be caused by virtue of the change of a material’s characteristics following overheat from a fire. It is therefore of the utmost importance to establish that the item is neither cracked, distorted or overheated. The degree of distortion may be difficult to assess if the precise original dimensions are not known, in which case there is no option but to reject the item. Any suggestion of overheating would be cause for a laboratory investigation into significant change of material properties.

## 6. DISPOSAL OF SCRAPPED PARTS

Those responsible for the disposal of scrapped aircraft parts and materials should consider the possibility of such parts and materials being misrepresented and sold as serviceable at a later date. Caution should be exercised to ensure that the following types of parts and materials are disposed of in a controlled manner that does not allow them to be returned to service:

- (a) parts with non-repairable defects, whether visible or not to the naked eye;
- (b) parts that are not within the specifications set forth by the approved design, and cannot be brought into conformity with applicable specifications;
- (c) parts and materials for which further processing or rework cannot make them eligible for certification under an approved system;



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- (d) parts subjected to unacceptable modifications or rework that is irreversible;
- (e) life-limited parts that have reached or exceeded their life limits, or have permanently missing or incomplete records;
- (f) parts that cannot be returned to an airworthy condition due to exposure to extreme forces or heat (see paragraph 5.2 above); and
- (g) principal structural elements removed from a high-cycle aircraft for which conformity cannot be accomplished by complying with the mandatory requirements applicable to ageing aircraft.

Scraping of parts and materials may not be appropriate in certain cases when there is an ongoing evaluation process to determine whether a part or material may be restored to an airworthy condition. Examples of these cases include the extension of life limits, the re-establishment of in-service history records, or the approval of new repair methods and technologies. In these cases, such parts should be segregated from serviceable parts until the decision has been made as to whether these parts can be restored to an airworthy condition, or be scrapped.

Scrapped parts should always be segregated from serviceable parts and when eventually disposed of should be mutilated or clearly and permanently marked. This should be accomplished in such a manner that the parts become unusable for their original intended use and unable to be reworked or camouflaged to provide the appearance of being serviceable.

When scrapped parts are disposed of for legitimate non-flight uses, such as training and education aids, research and development, or for non-aviation applications, mutilation is often not appropriate. In such cases the parts should be permanently marked indicating that they are not serviceable; alternatively, the original part number or data plate information can be removed or a record kept of the disposition of the parts.

## **7. THE CERTIFYING PERSON AND USER RESPONSIBILITY**

### **7.1 Certifying Person**

The Certifying Person (User) can be either the Approved Organisation, a person authorized in accordance with that organisation's Exposition, or an appropriately CAA Type Rated Licensed Engineer, who issues the Certificate of Release to Service for installation of an aircraft part into an aircraft, its engine(s), propeller(s) or equipment.

### **7.2 User Responsibility**

The User of an aircraft part is responsible for ensuring that the part is serviceable and conforms to the standard determined by the appropriate Type Certificate holder as being suitable for the intended application. In order to discharge this responsibility to the satisfaction of the CAA, the user must, when obtaining an aeronautical part from a supplier:

- (a) Ensure that the purchase order contains accurate definition of the aircraft parts and full details of the quality control and certification requirements to be met by the supplier in satisfying the order;



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- (b) Take all necessary steps to verify that the supplier is meeting the requirements of the purchase order. This may require the user visiting the supplier's facilities.

In order to contain the serious problem of unapproved parts, Air Transport Operators and associated Maintenance organisations who are users of aircraft spares should ensure that their aircraft spares purchasing policy and procedures are unequivocally stated in their company expositions. They should also ensure that any deviation from that policy must be approved by the Quality Manager in accordance with procedures acceptable to the CAA.

Foreign aircraft and approved component manufacturers can be contacted by users through their agent or direct, for verification that specific serial numbered items purported to be manufactured by them are in fact recorded in their archives.

As an example, this process was used to verify that a particular helicopter main rotor head mentioned in paragraph 1.1 was in fact bogus.



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